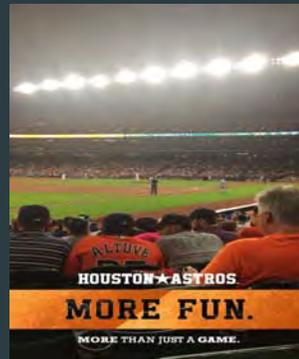


Converting to LED Sports Lights

Dan Bergstrom, CSFM



To clear any confusion - this talk is NOT about the use of grow lights on sports fields.



Minute Maid Park -

Metal halide fixtures

Maintenance:

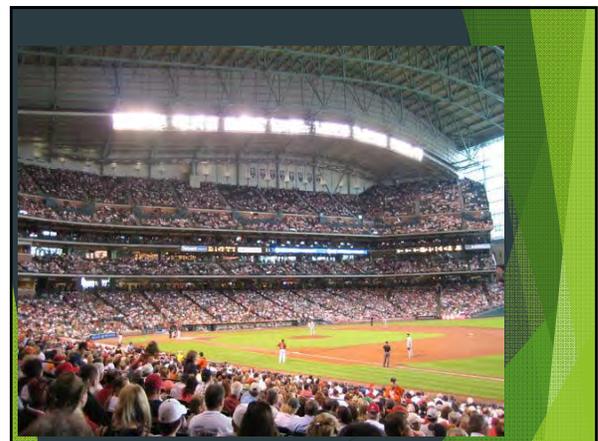
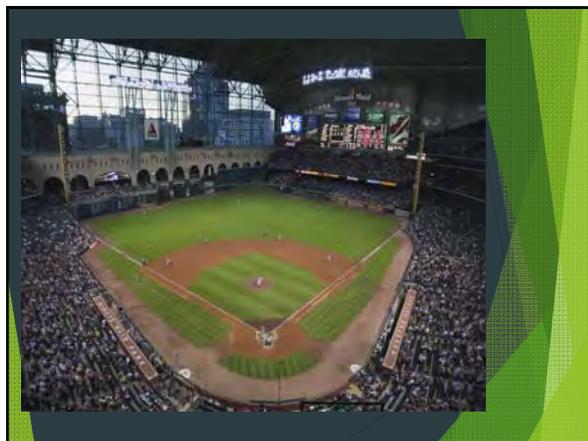
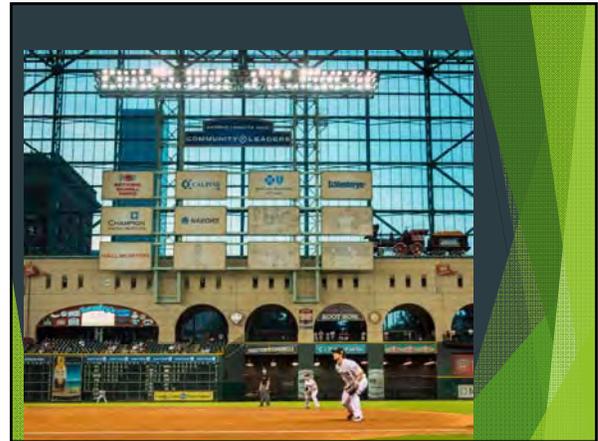
3 crew members raising/lowering bulbs to field surface.
Daily concerns.
Fixtures continually out.
Parts very hard to find.
Lenses break= glass on playing surface.

Metal Halide fixtures

Improved in design over time.
Precisely designed reflectors improved ability to aim/smooth the light over the target surface.
Fixture shields contained more light in facility.
Houston - 723 1500W fixtures.
Replace lens, fuses, control card (hot re-strike) bulb, capacitor, socket, ballast - labor!!!

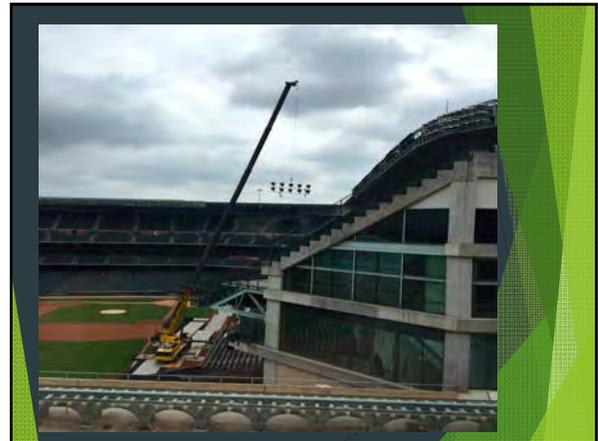
Houston specific fixture challenges:

Low height of fixtures due to retractable roof.
130 feet compared to 170 feet.
Lower fly balls and line drives affected by lights.



LED advantages:

- Lower energy use
- Less fixtures
- More hours of use
- Little to no light degradation
- Instant on/off capability
- Fine tuning uniformity fixture by fixture

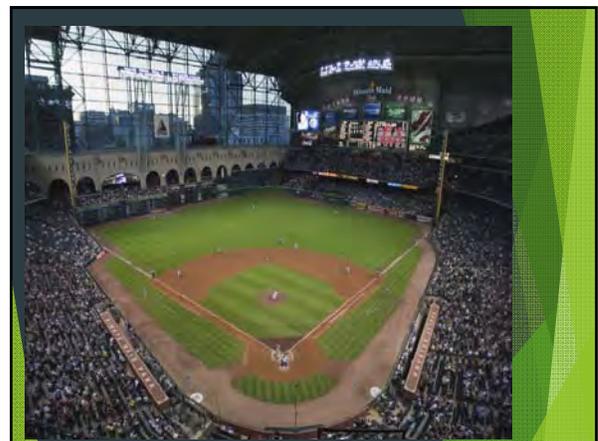
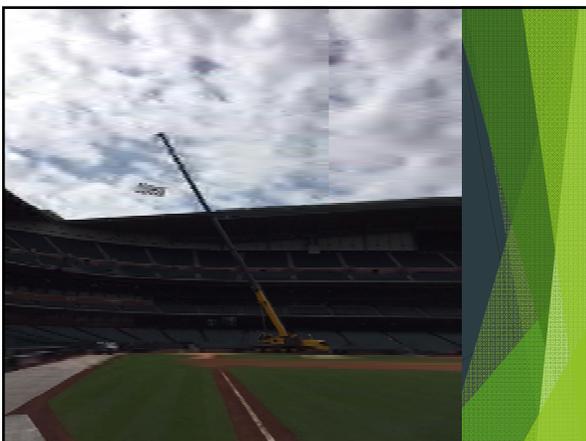
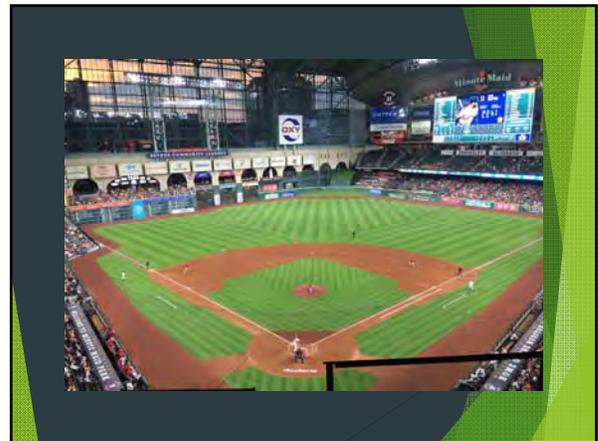


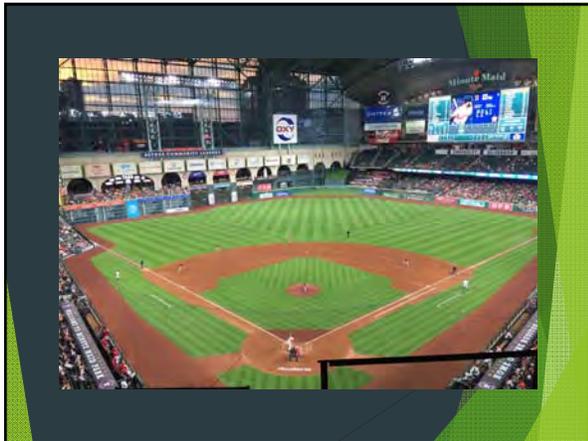
ROI

60%-75% reduction in electricity usage.

Varies with hours of usage.

May not be practical for low-hour sites to convert.





Brightness unintended consequence:
MMP main concourse looked dim after the new LEDs installed over the playing surface.
Similar effect to walking indoors after seeing bright sunlight on snow outdoors.
Adding light to the concourse could cause background issues for play.

Foot-candles- unit of measurement of light at a surface
Lumens – unit of measurement of light at the source
Lux – metric unit of measurement of light at a surface.

Don't confuse brightness of the fixtures with light on the playing surface.
Brightness is relative to background.
We measure the light that hits the surface.

Minimum light level requirements:
(horizontal foot candles)
MLB: 250 infield/200 outfield
NFL: 250
NCAAFB: 150
HSFB: 50
Little League 50/30
Check your league requirements -

Considerations for multi-sport surfaces:

MLB allows less light in outfield areas

Football, Soccer require uniform light.



Measuring grid size:

30ftx30ft - Baseball, Soccer, Football

20ftx20ft Softball

Uniformity:

Ratio of the brightest light to the lowest light on the surface.

2:1 or 2.5:1 typical.

Brightest areas of surface are not to be more than twice as bright as the dimmest areas.



Smoothness:

Light shall be consistent over the surface.

Variation in light level over 10ft distance shall be less than 10%

Glare Rating

Fan and player comfort.
Relative brightness compared to background. Turning on a spotlight at midnight compared to mid-day.
Scale of 10-100. 40 MLB max.
Computer software generated.

Reduce intensity of each fixture
Add more fixtures

Broadcast TV prefers the bluer light - better clarity.

No flicker in the LED light eliminates f-stop problems for cameras and allows improved slo-mo video.

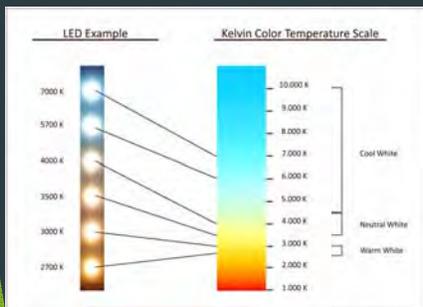
Tighter, slower, crisper TV camera shots with LED.

Kelvin Temperature

Red light vs blue light.

Metal Halide 4000. LED 5700.
We see objects better under blue light.

Some fixtures are tunable.



ANSI
OSHA

Both have workplace lighting standards.

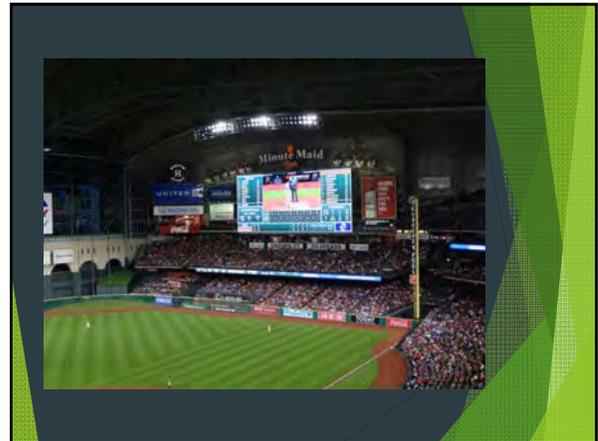
MLB LED Light Specification:

Lesson Learned

Protect teams from vendors w/bad ideas
Specification that is fair
Spec that is attainable.

Unknown how much LED lights will degrade over time. MLB is only League focusing on tracking this over time.

MLB delivered their specs in 2016.



LED fixture comparison tips:

Lenses sealed with silicone.
Possible fog sealed inside?
Did manufacturer use good quality silicone?
Overall quality of fixture.
Warranty comparisons.

Summary:

- 1)LED sports lighting is changing fast.
- 2)There are many advantages to LED lights.
- 3)Use good specifications when you go to bid.